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Why the iPhone Won't Last Forever and What the Government Should Do to Promote its Successor

By

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Because of the overwhelming, positive response to the iPhone as compared to other smart phones, exclusive agreements between handset makers and wireless carriers have come under increasing scrutiny by regulators and lawmakers. In this paper, we document the myriad revolutions that have occurred in the mobile handset market over the past twenty years. Although casual observers have often claimed that a particular innovation was here to stay, they commonly are proven wrong by unforeseen developments in this fast-changing marketplace. We argue that exclusive agreements can play an important role in helping to ensure that another must-have device will soon come along that will supplant the iPhone, and generate large benefits for consumers. These agreements, which encourage risk taking, increase choice, and frequently lower prices, should be applauded by the government. In contrast, government regulation that would require forced sharing of a successful break-through technology is likely to stifle innovation and hurt consumer welfare.

Introduction

In the summer of 2009, the Senate Commerce Committee held a hearing to explore the competitive effects of exclusive handset agreements in the wireless industry. Exclusive agreements typically allow one particular wireless operator to serve as the sole distributor of a manufacturer's handset for a given period of time. The new chairman of the Federal Communications Commission (FCC) has announced his intention to explore the issue of handset exclusivity. There are several pending petitions before the FCC that raise this issue, one of which seeks to ban exclusive handset contracts.

A key element that appears to be missing from the policy debate is whether exclusive contracts harm consumers. Antitrust scholars recognize that exclusive contracts have the potential under certain conditions to reduce consumer welfare. One condition concerns market power: one of the firms seeking an exclusive agreement must dominate access to consumers. A second condition is that the excluded product is needed by the dominant firm's rivals to constrain the prices the dominant firm can charge consumers. Economists sometimes refer to such a product as a "must-have" input. This article evaluates both conditions as applied to the U.S. mobile handset market. In Part II of this paper, we analyze whether Apple or any other manufacturer has established a dominant share in the mobile handset market. Market shares for smartphone sales in the United States reveal that, in the first quarter of 2009, RIM's BlackBerry Curve moved past Apple's iPhone to become the best-selling consumer smartphone in the United States—a result that is not consistent with the notion of dominance.³ We also review the rapid pace of innovation in handsets, which resulted in shifting market shares among handset makers. While exclusivity was not always the norm, we show that many of the iconic handsets introduced since

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3. NPD Group, RIM Unseats Apple in The NPD Group's Latest Smartphone Ranking, *available at* http://www.npd.com/press/releases/press_090504.html.

2004 have been introduced pursuant to an exclusive contract. Next, we analyze whether the iPhone is a “must-have” input for wireless carriers, and argue that it is not.

Antitrust scholars also recognize that exclusive agreements can promote consumer welfare by encouraging risk-taking by entrepreneurs, and by aligning the incentives of dealers and manufacturers. For example, the economics literature recognizes that exclusive contracts can address dealer-incentive issues that arise when the manufacturer wants the dealer to invest in specific facilities or human capital to provide better service to consumers. In the absence of such agreements, dealers may not invest in an efficient level of promotion. Because exclusive contracts have the potential to increase or decrease welfare, they are analyzed under a “rule of reason” framework, which balances the benefits and costs of permitting such contracts. In Part III of this report, we explain that exclusive handset contracts are motivated for three procompetitive reasons: (1) to share the enormous risk associated with launching a new device, (2) to align the incentives of the carrier with the handset maker, and (3) to ensure network quality. From the perspective of a handset maker like Apple, aligning with a single carrier like AT&T ensures that Apple does not incur all of the downside risk in the event that the phone is not a success. The agreement also ensures that AT&T will make iPhone-specific investments such as marketing support, handset subsidies, and modifying its network to accommodate bandwidth-intensive applications.

New technologies often seemingly emerge from nowhere, but also frequently lose their luster quickly. Consider the fleeting success of Second Life, the virtual online world that was supposed to induce Americans to check out of their first life. Analysts predicted that Second Life could top the World Wide Web as *the* way to tap the Internet’s resources.⁴ Some even thought it could challenge the Microsoft Windows operating system.⁵ The hype induced corporate giants like Nike and IBM to develop a presence in this virtual world.⁶ Reuters stationed a reporter at its first virtual news bureau inside Second Life.⁷ IBM sank \$10 million on initiatives to further develop Second Life and the online three-dimensional world generally.⁸ Despite this hype, Second Life became part of a “hat trick that didn’t happen,” and the frenzy surrounding the online game fizzled.⁹ As of July 2009, the site was populated by less than 90,000 users at a time.¹⁰ Second Life’s history has become just another cautionary tale, illustrating the short shelf life of some technologies that had high expectations.

MySpace marks another example of the transient nature of a so-called dominant technology. MySpace emerged in 2003, and by 2006, had grown to 70 million users.¹¹ Its superior music and video capabilities helped the network edge out Friendster and other competitors to become the most popular

4. Robert D. Hof, *My Virtual Life*, BUSINESSWEEK, May 1, 2006, available at http://www.businessweek.com/magazine/content/06_18/b3982001.htm.

5. *Id.*

6. David Kirkpatrick, *Second Life: It’s not a game*, CNNMONEY, Jan. 23, 2007, available at http://money.cnn.com/2007/01/22/magazines/fortune/whatsnext_secondlife.fortune/index.htm.

7. Andrew Adam Newman, *The Reporter Is Real, but the World He Covers Isn’t*, NEW YORK TIMES, 16 Oct. 2006.

8. Kirkpatrick, *supra*.

9. Richard Siklos, *The Hat Trick That Didn’t Happen*, NEW YORK TIMES, Dec. 10, 2006.

10. *Online playgrounds*, THE ECONOMIST, July 23, 2009.

11. Saul Hansell, *For MySpace, Making Friends Was Easy. Big Profit Is Tougher*, NEW YORK TIMES, Apr. 23, 2006, available at <http://www.nytimes.com/2006/04/23/business/yourmoney/23myspace.html>.

social network.¹² Rupert Murdoch's News Corp. paid \$649 million in 2005 for InterMix Media, owner of MySpace, before the company had managed to turn a significant profit.¹³ Some analysts asserted that MySpace was a "natural monopoly," citing the high switching cost of moving from one social network to another as an impenetrable "network effect" giving MySpace dominance over other social networks.¹⁴ By June 2009, Facebook, a rival social network, roughly doubled in size and became the largest network in the United States and globally while MySpace lost 5 percent of its users.¹⁵

In this article, we explain how the mobile handset market is subject to these same disruptive forces—an iconic handset emerges, is quickly crowned the "winner," and soon thereafter is replaced by another technology that was not even conceived of at the time the "winner" was launched. Many iPhone-inspired smartphones, including the BlackBerry Storm and the HTC G1, could unseat the iPhone in the smartphone segment. We argue that heavy-handed regulation of such dynamic markets is likely to reduce welfare on net.¹⁶ The cost of erring through regulatory intervention—for example, by restricting voluntary private agreements that promote risk taking—can be significant.¹⁷ Delaying the benefits associated with innovation in mobile handsets could cost consumers dearly. In sum, exclusive contracts between handset makers and wireless carriers benefit consumers by encouraging innovation by both handset makers and wireless service providers that are vying for market share, and by enabling some handset makers to remain viable. These benefits take the form of greater variety of choices in handsets, greatly enhanced capabilities, and a more affordable range of device options. Banning exclusive contracts could have the unintended consequence of reducing innovation, reducing options, raising prices, and potentially establishing market dominance for an incumbent handset maker.

I. A brief economic history of disruptive revolutions in the handset market

The preceding examples of products that were thought to be the "next big thing" and turned out to be passing fancies suggest that we should be careful in making predictions about the dominance of a technology, network, or even an idea.¹⁸ A review of the history of the wireless handset market reveals that the pronouncements about the dominance of the iPhone are similarly premature.

12. *MySpace, Facebook and Other Social Networking Sites: Hot Today, Gone Tomorrow?*, KNOWLEDGE@WHARTON, May 3, 2006, available at <http://knowledge.wharton.upenn.edu/article.cfm?articleid=1463>.

13. Hansell, *supra*.

14. Victor Keegan, *Will MySpace ever lose its monopoly?*, THE GUARDIAN, Feb. 8, 2007, available at <http://www.guardian.co.uk/technology/2007/feb/08/business.comment>; John Barrett, *MySpace Is a Natural Monopoly*, TECHNEWSWORLD, Jan. 17, 2007, available at <http://www.technewsworld.com/story/55185.html>.

15. *Facebook dethrones MySpace in the U.S.*, LOS ANGELES TIMES, Jun. 16, 2009, available at <http://articles.latimes.com/2009/jun/16/business/fi-facebook16>. The MySpace and Second Life examples concern applications. There are also examples of fleeting dominance on the device side, such as the Sony Walkman and the VCR.

16. See, e.g., Robert W. Crandall, Robert W. Hahn, Robert E. Litan, & Scott Wallsten, *Internet Telephones: Hanging up on Regulation?* 6 (3) MILKEN INSTITUTE REVIEW 30-34 (2004): 30-34; Robert W. Hahn, *Competition Policy and the New Economy*, 3(1) MILKEN INSTITUTE REVIEW 33-41 (2001).

17. See, e.g., Jerry Hausman, *Valuation and the Effect of Regulation on New Services in Telecommunications*, BROOKINGS PAPERS ON ECONOMIC ACTIVITY: MICROECONOMICS 1-38 (1997).

18. Consider Francis Fukuyama's now infamous conclusion that America's victory over the Soviet Union marked the "end of history" and "the endpoint of mankind's ideological evolution and the universalization of Western liberal democracy as the final form of human government." Francis Fukuyama, *The End of History?*, 16 THE

A. Innovative handsets from the last two decades

Marty Cooper is the engineer who is credited with converting the cellular technology used in car phones of the 1970s into portable handsets. In April 1973, Motorola hosted a press conference at the Hilton New York to introduce Cooper's prototype of a cell phone. The handset, called a DynaTAC, had 35 minutes of talk time and weighed 2.2 pounds. In 1983, Motorola introduced a "lighter" version of DynaTAC (still weighing over one pound) with a list price of \$4,000.¹⁹

In 1989, Motorola introduced the MicroTAC flip phone.²⁰ At 12 ounces, it was approximately half the size of any of its rivals and was able to fit into a shirt pocket; the phone was originally priced at \$2,995 (a full 25 percent discount from the earlier model).²¹ *Fortune* magazine reported that the end of innovation was near: "Portable phones won't get a lot smaller than this one. After all, they have to reach from your ear to your mouth."²² In 1996, Motorola offered a 3.1 ounce StarTAC mobile phone, hailed as the first wearable phone. One media source suggested that StarTAC was "about to revolutionize the cellular industry."²³ Another analyst (incorrectly) predicted that the StarTAC would ensure that the next generation of cell phones would be "worn on your wrist, a la Dick Tracy."²⁴ Still others predicted the introduction of "kid phones," with "only two buttons: one for mommy and one for daddy."²⁵ With the benefit of hindsight, it is now clear that neither the MicroTAC nor the StarTAC would mark the pinnacle of innovation in cell phones.

Although each of these phones was considered cutting-edge or "iconic" when introduced, these names have faded into obscurity with the passage of time. In this decade, brands like Treo, Blackberry, Razr, and iPhone have all competed for dominance in the handset market. The evolution of mobile handsets from the mid-1990s through 2002 set the stage for the introduction of personal digital assistants, thin phones, and more recently, smartphones.

TABLE 1: A HISTORY OF ICONIC HANDSETS

Company	Model	Year Introduced	Category	Innovation	Exclusive (w/ whom)
Motorola	MicroTAC	1989	NA	Flip-phone	
Motorola	StarTAC	1996	NA	Reduced size	
Nokia	9000 Communicator	1996	Personal digital assistant	Combine phone, fax, email	
Handspring	Treo 180	2002	Personal digital assistant	Combine personal digital assistant w/ cell phone	
Motorola	Razr V3	2004	Thin	Reduced size	AT&T
Danger	Sidekick	2002	Smartphone	Offer email and	T-Mobile

NATIONAL INTEREST 3-18 (1989). This idea has now been discredited by the proliferation of authoritarian regimes over the last two decades that stand in stark opposition to liberal principles of the United States and Western Europe.

19. *Father of the cell phone*, THE ECONOMIST, June 6, 2009.

20. Geoffrey Rowan, *Personal Cellular Phone Unveiled by Motorola*, THE GLOBE AND MAIL, Apr. 26, 1989.

21. Brian O'Reilly, *Gadgets for Executives*, FORTUNE, Sep. 11, 1989.

22. *Id.*

23. *Motorola Puts Communications in the Palm of Your Hand*, PR NEWSWIRE, Jan. 3, 1996.

24. Howard Wolinsky, *Cell Phones Keep Ringing Up Sales*, CHICAGO SUN-TIMES, Jan. 14, 1996, at 39.

25. *Id.*

				web surfing to mass market	
RIM	Blackberry Pearl	2006	Smartphone	Reduced size; integration of push e-mail with media	T-Mobile
RIM	Blackberry Curve	2007	Smartphone	Reduced size; integration of push e-mail with media	AT&T
Apple	iPhone	2007	Smartphone	Multi-touch screen, operate on a 3G or Wi-Fi network, visual voicemail	AT&T
Palm	Pre	2009	Smartphone	Run multiple apps at same time; combines e-mail, pictures, video, and web contacts	Sprint
HTC	G1	2009	Smartphone	Google's Android platform, already has thousands of third-party applications	T-Mobile

Table 1 shows that exclusive contracts were not always the norm; however, many, if not all, of the iconic handsets introduced since 2004 have been introduced pursuant to an exclusive contract. Although we cannot demonstrate that exclusive agreements were the cause of the recent innovation, it is clear that exclusive contracts are associated with recent innovation. (We discuss the use of these contracts, and the reasons for believing they promote innovation in this case, in Part III.)

Personal Digital Assistants. In 1993, BellSouth and IBM jointly introduced the Simon Personal Communicator, the first mobile handset that included pager, calculator, and calendar.²⁶ The handset weighed 21 ounces and sold for \$900.²⁷ The Simon was hailed for its uniqueness. One article announcing its release described it as “the first time a company had placed a computer in a cellular phone, rather than placing a cellular phone in a computer.”²⁸

26. Al Sacco, A Brief History of the Mobile Phone (1973-2007), CIO, available at http://advice.cio.com/al_sacco/a_brief_history_of_the_mobile_phone_1973_2007

27. *Id.*

28. Bell South, IBM Unveil Personal Communicator Phone, MOBILE PHONE NEWS PHILLIPS BUSINESS INFORMATION, Nov. 8, 1993.

In 1996, Nokia launched the Nokia 9000 Communicator.²⁹ The Nokia 9000 was hailed as “revolutionary” and as signaling “the birth of the real information age.”³⁰ The device combined phone, fax, address book, and e-mail in a single interface.³¹

In the same year, Palm introduced the Pilot as its first personal digital assistant. It enabled people to organize all their data on a computer, and then sync it to the device.³² Before being acquired by Palm, Handspring introduced the Treo 180, which merged the Palm with a cell phone in 2002.³³ The Treo 180 retailed for \$399 and was available with either a built-in keyboard or “Graffiti” based handwriting software. The Treo was offered by both Cingular and VoiceStream,³⁴ which was later acquired by T-Mobile. The Treo 180 was highly praised upon its introduction. Walter Mossberg of the *Wall Street Journal* called the Treo 180 “the best combination of a phone and personal digital assistant by far.”³⁵ But users quickly tired of being tethered to a computer, as they increasingly kept their data in multiple locations. They also were longing for a device that was more convenient to carry, which led to the next innovation.

Thin phones. In 2004, Motorola’s Razr revolutionized the cell phone industry once again by shifting the focus from handset features to phone size.³⁶ Motorola recognized the need for simplicity when it developed the Razr.³⁷ Initially conceived as an “iconic, image-leading, low-sales-volume” product, the Razr exceeded expectations with sales topping the company’s total lifetime projections just three months after its August 2004 release.³⁸ Roger Jellicoe, manager of the Razr development project, recognized the phone’s potential and knew that it could “change the industry.”³⁹ He insisted that “once you picked up the Razr and used it, you never wanted another phone.”⁴⁰

The Razr became the top-selling phone in the United States in 2005 and held that position until the third quarter of 2008, when the iPhone 3G took the lead.⁴¹ Motorola’s profits, however, began to slide well before the Razr was overturned as the most popular phone.⁴² The price of the phone

29. *Technology—Nokia Launches “Smart Phone”*, NEW AGE MEDIA, Mar. 21, 1996.

30. *Nokia Pioneers New Product Category With The World’s First All-In-One Communicator*, BUSINESS WIRE, Mar. 13, 1996.

31. *Id.*

32. Walter S. Mossberg, *A Palm Size Computer That’s Easy to Use and Cheap—Finally*, WALL STREET JOURNAL, Mar. 28, 1996.

33. *Handspring Treo Communicator Available Nationwide to U.S. Customers*, BUSINESS WIRE, Feb. 11, 2002.

34. *See Handspring Treo Communicator Available Nationwide to U.S. Customers*, BUSINESS WIRE, Feb. 11, 2002.

35. Walter S. Mossberg, *Mossberg’s Mailbox*, WALL STREET JOURNAL, Feb. 28, 2002.

36. Sacco, *supra*.

37. Scott D. Anthony, *Motorola’s Bet on the Razr’s Edge*, Harvard Business School Working Knowledge, Sept. 12, 2005, available at <http://hbswk.hbs.edu/archive/4992.html>. Reprinted from Scott D. Anthony, *Making the Most of a Slim Chance*, STRATEGY & INNOVATION, Vol. 3, No. 4, July/August 2005.

38. *Id.*

39. *Id.*

40. *Id.*

41. Joshua Topolsky, *iPhone 3G overtakes the RAZR as best-selling domestic handset*, ENGADGET, Nov. 10, 2008, available at <http://www.engadget.com/2008/11/10/iphone-3g-overtakes-the-razr-as-best-selling-domestic-handset/>.

42. Sara Silver & Roger Cheng, *Motorola Profit Falls 94%, And Icahn Puts on Pressure*, WALL STREET JOURNAL, Oct. 26, 2007.

plummeted and new models did little to boost revenue, as Motorola struggled to sell its high-end phones. The revenues of Motorola's mobile-device division declined by over one third in 2007.⁴³ In that same quarter, Motorola Inc. posted a 94 percent decline in net profit.⁴⁴

Smartphones. The next revolution in handsets connected personal digital assistants to the Internet. In May 2009, Morgan Stanley Research described the migration to Internet-connected mobile devices, including smartphones, as "one of the biggest opportunities in the history of the technology industry."⁴⁵ "Smartphones" are cell phones that have many features of a desktop computer and are connected to the Internet. In addition to allowing people to make calls and check e-mail, smartphones can run programs or "apps" designed by third-party developers.

Smartphones have been around for more than a decade. Yet of the billion-plus mobile phones operating throughout the world, only ten percent are estimated to be smartphones, suggesting tremendous growth potential.⁴⁶ Gartner Research estimates that sales of smartphones will increase by over 27 percent in 2009 to approximately 170 million units.⁴⁷ Morgan Stanley Research predicts smartphones will account for nearly half of all mobile phones in the near future.⁴⁸

In 2005, Nokia launched the N series, a new line that combined a web browser, video, music and pictures into a single phone. According to analysts (who evidently could not see Blackberry or the iPhone on the horizon), the devices moved Nokia a generation ahead in the race to build the first real smartphone.⁴⁹ But it was Research in Motion (RIM) and not Nokia that pioneered the smartphone segment. Although RIM's Blackberry was not the first wireless device with reliable e-mail access, it popularized mobile e-mail among business professionals because of its integration with Microsoft Exchange servers and strong encryption. "Push" e-mail alerted users whenever they received a new e-mail without having to continually check the server. Large corporations adopted the device en masse; for example, in February 2000, RIM announced a deal with Solomon Smith Barney to supply thousands of devices to its employees.⁵⁰ By December 2000, RIM had at least 115,000 Blackberry subscribers,⁵¹ and by March 2001, RIM had at least 400,000, 70 percent of whom were connected through their corporate servers.⁵² In January 2002, over 13,000 corporations allowed their employees to access their e-mail on a

43. *Id.*

44. *Id.*

45. MORGAN STANLEY RESEARCH, APPLE INC., May 26, 2009, at 3.

46. Josh Quittner, *The Well; Technology Smart Phones The Plot to Take On The iPhone*, TIME, June 15, 2009.

47. See Gartner Research Press Release, *Gartner Says Worldwide Smartphone Sales Reached Its Lowest Growth Rate With 3.7 Percent Increase in Fourth Quarter of 2008*, GARTNER RESEARCH, Mar. 11, 2009, available at <http://www.gartner.com/it/page.jsp?id=910112> (Table 2 says that 2008 worldwide smartphone sales volume was 139,287,900 units). Also see Gartner Research Press Release, *Gartner Says Worldwide Mobile Phone Sales Declined 6 Per Cent and Smartphones Grew 27 Per Cent in Second Quarter of 2009*, GARTNER RESEARCH, Aug. 12, 2009, available at <http://www.gartner.com/it/page.jsp?id=1126812> ("Smartphone sales were strong during the second quarter of 2009, with sales of 40.9 million units in line with Gartner's forecast of 27 per cent year-on-year sales growth for 2009....").

48. MORGAN STANLEY RESEARCH, APPLE INC., May 26, 2009.

49. Adam Smith, *Global Business; Phone Wars Nokia Plays It (Not Too) Smart*, TIME, Aug. 24, 2009.

50. Mark Guibert, *Research In Motion, Ltd.—Research in Motion to Supply BlackBerry Wireless*, CANADA STOCKWATCH, Feb. 8, 2000.

51. *Research In Motion Blackberry Subscribers Now 115,000*, DOW JONES NEWS SERVICE, Dec. 20, 2000.

52. Christine Y. Chen and Ellen Florian, *8 Wireless E-Mail*, FORTUNE, Mar. 19, 2001.

Blackberry.⁵³ In 2002, RIM introduced the Blackberry 5810, which combined the Blackberry's e-mail capabilities with wireless voice functionality.

Rival handset makers were trying to topple BlackBerry in the smartphone segment, but with less success. In 2001, Kyocera introduced the Kyocera 6035.⁵⁴ The Kyocera 6035 was the first widely available smartphone with a Palm operating system.⁵⁵ It was described as "the first really good [personal-digital-assistant]-equipped phone" by Walter Mossberg.⁵⁶ In 2002, Danger, Inc. in conjunction with T-Mobile introduced the T-Mobile Sidekick.⁵⁷ The Sidekick was hailed as a "breakthrough wireless device" because it was the first device to offer user friendly e-mail, web surfing, and instant messaging at a price affordable to consumers rather than business people.⁵⁸ The device originally retailed at \$199 after a rebate with unlimited data use for \$39.99.⁵⁹

The next major upheaval within the smartphone segment was launched by Apple in 2007. Where the BlackBerry succeeded among corporate users, the iPhone succeeded among mass-market users. Smartphone productivity features of the iPhone included email, text messaging, web browsing, contacts, a calendar, and a notepad. The iPhone also came equipped with a built-in camera and a voice recorder. It had the capability to operate on a 3G or Wi-Fi network,⁶⁰ which allowed users to download data at relatively high speeds. The iPhone also had the capability to sync emails, contacts and calendars wirelessly and has a search feature for users to find items in its standard applications.

Despite iPhone's many impressive features that made it so popular with consumers, businesses were initially disappointed that the phone lacked the feature that made the BlackBerry so popular: push e-mail.⁶¹ The second generation iPhone, released in June 2008, added GPS, high-speed 3G cellular network access, and push e-mail, along with security features to lure businesses.⁶² Another key feature of the iPhone was the wide range of applications available for download both over the air and through the iTunes application for personal computers; as of August 2009, there were about 65,000 available.⁶³ Apple's open platform has allowed independent developers to create and sell these applications,

53. *AT&T Wireless and Research In Motion to Offer Integrated Wireless Device for Managing Email and Phone Calls*, CANADA NEWSWIRE, Jan. 29, 2002.

54. Steve Gold, *A Smartphone with Palm OS From Kyocera*, NEWSBYTES NEWS NETWORK, Mar. 2, 2001.

55. *Id.*

56. David Akin, *New Cellphone Can Surf the Internet*, FINANCIAL POST, Jun. 29, 2001.

57. Sacco, *supra*; Walter S. Mossberg, *Phone, E-mail—Even Camera—in a \$199 Device*, WALL STREET JOURNAL, Aug. 8, 2002.

58. *Id.*

59. *Id.*

60. Proponents of "wireless net neutrality" often claim that AT&T disabled Wi-Fi capability on its devices. See Robert Hahn, Robert Litan, and Hal Singer, *The Economics of Wireless Net Neutrality*, 3 J. COMP. L. ECON. 399 (2007). The fact that many devices, including the iPhone, have such capabilities undermines those claims.

61. Daniel D. Turner, *Enterprise Hurdles Await iPhone*, EWEK, Jun. 22, 2007, available at <http://www.eweek.com/c/a/Mobile-and-Wireless/Enterprise-Hurdles-Await-iPhone/> ("The number one problem with the iPhone is that enterprise users want to push e-mail," said Jack E. Gold, principal analyst at technology advising firm J. Gold Associates in Northborough, Mass").

62. Apple Inc. Press Release, *Apple Introduces the New iPhone 3G*, APPLE INC., Jun. 9, 2008, available at <http://www.apple.com/pr/library/2008/06/09iphone.html>.

63. Mark A. Kellner, *T-Mobile Challenges iPhone*, WASHINGTON TIMES, Aug. 5, 2009.

incentivizing innovation and expanding the capabilities of the device. These applications range from video games to a Microsoft Office document reader.

A feature of the iPhone that received a great deal of attention was its touch-screen interface. Unlike many rival devices, the iPhone did not have a physical keyboard, relying instead on a touch-screen keyboard that appears on its display when prompted to by the user. Users scroll through pages with the flick of a finger, and can zoom into and out of pages with two-finger pinching motions. Walter Mossberg and Katherine Boehret of the *Wall Street Journal* described this touch-screen interface as “effective, practical, and fun.”⁶⁴

By January 2009, more than 21 million iPhones had been sold.⁶⁵ As of July 2008, there were more than one billion downloads from the App Store since its launch.⁶⁶ As of May 2009, Morgan Stanley estimated that the iPhone accounted for 15 percent of global smartphone sales and 2 percent of all mobile devices.⁶⁷ Morgan Stanley predicted that iPhone’s share of the smartphone sales would reach 17 percent by the end of 2010.⁶⁸ Despite these seemingly modest shares, the iPhone’s popularity—and its exclusive agreement with AT&T—caught the attention of regulators.⁶⁹

The Palm Pre hopes to become the next iconic phone within the smartphone category. The Palm Pre launched June 6, 2009 for \$199 at Sprint stores.⁷⁰ The Palm team is staffed with former Apple employees and is led by Palm president Jon Rubinstein, who built the original iPod for Steve Jobs (based around a tiny hard drive he discovered at Toshiba) and developed the iMac, which helped resuscitate Apple’s fortunes.⁷¹ Analysts recognized that a wireless user’s e-mail, pictures, video, and Facebook/LinkedIn/Twitter contacts were increasingly hard to manage, even on the sleek iPhone. Pre’s operating system, WebOS, claims to wirelessly combine all of those data into one comprehensive contact list, without duplicates.⁷² When users start typing on the Pre, WebOS pulls up a pane that searches the user’s contacts and also gives the user the option to search via Google, Wikipedia or Twitter. WebOS is designed to simulate the Web itself. Accordingly, anyone who can build a website can write applications for this platform, which is why Palm expects a flood of applications for the Pre. Finally, unlike the iPhone, the Pre can run several applications simultaneously. Each application is represented by a virtual card after it launches; switching between programs requires “leafing through the cards.” The iPhone’s significant technological lead over other smart phones likely created the impetus for Palm’s innovation and potentially others.

64. Walter S. Mossberg & Katherine Boehret, *Testing Out the iPhone—We Spend Two Weeks Using Apple’s Much-Anticipated Device To See if It Lives Up to the Hype; In Search of the Comma Key*, WALL STREET JOURNAL, Jun. 27, 2007.

65. Josh Quittner, *The Well; Technology Smart Phones The Plot to Take On The iPhone*, TIME, June 15, 2009.

66. *Smart-phone wars*, THE ECONOMIST, June 13, 2009.

67. MORGAN STANLEY RESEARCH, APPLE INC., May 26, 2009, at 3.

68. *Id.* at 7.

69. See Section II, *infra*.

70. In September 2009, Palm announced it was cutting the Pre’s price to \$149 with a two-year service agreement with provider Sprint Nextel Corp. and after a \$150 instant rebate and a \$100 mail-in rebate. The price decrease brought the Pre closer to the iPhone, which sold for \$99. See Yukari Iwatani Kane & Roger Cheng, *Palm Unveils Pixi Smart Phone*, WALL ST. J., Sept. 10, 2009.

71. Josh Quittner, *The Well; Technology Smart Phones The Plot to Take On The iPhone*, TIME, June 15, 2009.

72. *Id.*

Competition in the mobile handset market continues to be fierce. Two days after the Pre's launch, Apple unveiled a newer version of its iPhone, the iPhone 3Gs. The updated model is up to twice as fast as the iPhone 3G and features a longer battery life. Other improvements include the ability to record video, a 3 megapixel autofocus camera, and hands free voice control.⁷³ Finally, smartphones do not constitute the "last" category of the next new thing in handsets. Computer makers have shrunk the size of laptops down to eleven inches or smaller, creating a new class of mobile devices called "netbooks" or "minis," which have been optimized for mobility and sell for under \$500. An even faster version of the netbook called "ultrathins," which are priced between \$500 and \$900 and weigh under five pounds, were introduced in 2009.⁷⁴ According to IDC Research, netbook sales are expected to more than double in 2009, from 11.6 million units in 2008 to 26.5 million in 2009.⁷⁵ When these devices are equipped with wireless chips (along with a mobile data plan), they become substitutes for smartphones.

B. Market dynamics: share changes among handset makers around the introduction of the iconic device

With major innovations in the mobile handset segment in the wireless industry coming from a number of different firms, we would expect to see changes in market share over time and the absence of a clear, dominant firm that controls access to well over half of all customers.⁷⁶ Based on analysis of the data below, we conclude that no firm, including Apple, had a dominant share of the handset market—either in the United States or globally—over our study period (2005 to 2009), and that shares are not stable over time due to innovations among new handset makers.

1. Smartphone Segment

Market shares for smartphone sales in the United States are tracked by NPD Group, which estimated that in the first quarter of 2009, RIM's BlackBerry Curve moved past Apple's iPhone to become the best-selling consumer smartphone in the United States.⁷⁷ NPD Group estimated that RIM's share of smartphone sales in the United States increased to nearly 50 percent in 2009, while Apple's and Palm's share of that segment both declined 10 percent each.⁷⁸ Other estimates place RIM's share of the U.S. smartphone segment at slightly over 50 percent, well ahead of Apple.⁷⁹ Apple is similarly not dominant in the global market for smartphone sales. Table 2 shows that Apple accounted for less than eleven percent of global smartphone sales as of the first quarter of 2009. Indeed, Nokia, the market leader, controlled less than half of the smartphone segment—far short of dominance—over the period studied.

73. Apple Press Release, *Apple Announces the New iPhone 3GS—The Fastest, Most Powerful iPhone Yet*, Jun. 8, 2009, available at <http://www.apple.com/pr/library/2009/06/08iphone.html>.

74. Brandon Bailey, Makers hope new 'ultrathin' notebooks fill a niche, *Phil. Inquirer*, Sept. 16, 2009, available at http://www.philly.com/philly/business/technology/091609_ultra_thin_notebooks.html.

75. *Id.*

76. Antitrust courts have considered market shares above 60 percent to be dominant. *See, e.g.,* United States v. Dentsply Int'l, Inc., 399 F.3d 181, 187 (3d Cir. 2005) ("a share significantly larger than 55% has been required to establish prima facie market power"). Although the threshold varies across circuits, the requisite share for determining dominance appears to be above 50 percent.

77. NPD Group, RIM Unseats Apple in The NPD Group's Latest Smartphone Ranking, available at http://www.npd.com/press/releases/press_090504.html.

78. *Id.*

79. Jessi Hempel, *How Blackberry Does It*, *FORTUNE*, Aug. 31, 2009 (citing IDC data).

TABLE 2: WORLDWIDE SMARTPHONE SHARE (BASED ON UNITS SOLD), 2005-09

Company	1Q09 Market Share (%)	1Q08 Market Share (%)	1Q07 Market Share (%)	1Q06 Market Share (%)	1Q05 Market Share (%) ***
Nokia	41.2	45.1	46.7	42.0	9.9
RIM	19.9	13.3	8.3	6.5	20.8
Motorola	*	*	*	5.3	*
Palm	*	*	*	5.0	18.0
HP	*	*	*	*	17.6
Dell	*	*	*	*	6.3
Apple	10.8	5.3	0.0	*	*
Sharp/HTC	5.4	4.0	7.0	*	*
Fujitsu	3.8	4.1	5.0	*	*
Others**	18.9	28.2	33.0	41.2	27.3
Total	100	100.0	100.0	100.0	100.0

Note: * Less than three percent share. ** Incorporates the shares of carriers with less than three percent share. *** Personal digital assistant share only.

Source: 1Q08 and 1Q09 market shares available at <http://www.gartner.com/it/page.jsp?id=985912>; 1Q07 market shares available at <http://www.gartner.com/it/page.jsp?id=688116>; 1Q06 market share available at <http://www.gartner.com/it/page.jsp?id=496997>; 1Q05 market share available at <http://www.gartner.com/it/page.jsp?id=492135>.

As Table 2 shows, the global shares of smartphone makers are not stable over time. For example, Apple suddenly emerges on the list of leading smartphone suppliers in 2008; while other manufacturers, such as Palm and Motorola, disappear. The only exception to this rule is Nokia, which has maintained a steady share between 40 and 45 percent over the time period analyzed. To understand what drove these shifts in market share, in what follows, we briefly summarize the major developments in the smartphone segment since 2005. As our discussion makes clear, share shifts are largely driven by the continuous introduction of the next, iconic phone.

By the first quarter of 2005, personal digital assistants with integrated wireless local area network or cellular capabilities accounted for approximately 55 percent of all personal digital assistants shipped.⁸⁰ RIM was the leading supplier of personal digital assistants shipments. Palm's personal digital assistants shipments declined significantly; its market share in the personal-digital-assistant segment fell from 30.5 to 18 percent, its lowest market share since it entered the personal-digital-assistant segment in 1996.⁸¹ Nokia's re-entry into the personal-digital-assistant segment with its 9300 and 9500 models enabled Nokia to gain a significant foothold.⁸²

In the first quarter of 2006, Nokia accounted for 42 percent of the combined personal-digital-assistant and smartphone segment.⁸³ Motorola smartphone shipments roughly doubled in the first half of 2006, driven by the success of Motorola's Linux-based devices in China. Gartner presciently noted that Motorola was "not making significant progress with its Microsoft and Symbian-based smartphones

80. Gartner Says Wireless E-Mail Applications Drive Worldwide PDA Shipments Increase 25 Percent in First Quarter of 2005, available at <http://www.gartner.com/it/page.jsp?id=492135>.

81. *Id.*

82. *Id.*

83. Nokia's share in 2006 is not directly comparable with its share in 2005 because Gartner changed the category from personal digital assistants only in 2005 to "Combined smartphones and personal digital assistants" in 2006.

and shipments of the Motorola Q have been hampered by the minimum \$80 monthly service plan offered by Verizon.”⁸⁴ RIM enjoyed an increase in sales of 60 percent year-on-year, lifted by the newfound popularity of the BlackBerry. Palm experienced a sales decrease of 26 percent in the first half of 2006, as “the company shifted its focus on sales of its Treo smartphones.”⁸⁵

In the first quarter of 2007, Palm and Motorola disappeared from the Gartner survey of the leading providers of smartphones. In the first quarter of 2008, Nokia still enjoyed 45 percent of the global smartphone segment; Gartner credits Nokia’s success to the “variety of its smartphone portfolio, which includes a number of both high-end and mid-tier models available at different price points.”⁸⁶ RIM saw its share double from 2006, driven by sales of the BlackBerry Curve and Pearl. Seemingly out of nowhere, Apple became the third largest provider of smartphones with a 5.3 percent share, thanks to the introduction of the iPhone.

In the first two quarters of 2009, Nokia managed to increase its sales in the smartphone segment by introducing the Nokia 5800 into more regions.⁸⁷ Nokia’s N97 smartphone “met little enthusiasm at its launch in the second quarter of 2009.”⁸⁸ Apple’s iPhone 3G S sold 1 million units in its first weekend; its sales were also boosted by Apple’s expansion into a larger number of countries and its price adjustments on the 8GB 3G iPhone.⁸⁹ RIM continued to grow its share, while HTC lowered its expectations for the second half of 2009 due to product delays.⁹⁰

2. Other Segments of the Handset Market

Radical shifts also occurred in the non-smartphone segment of the handset market over the same time period. As in the smartphone segment, Nokia was the industry leader, yet its share was below 40 percent from 2005 through 2009. Table 3 shows shares for what Gartner calls the “mobile terminal sales to end users,” which includes smartphone sales (smartphone sales accounted for 13.5 percent of all handset sales in the first quarter of 2009), but also includes simpler phones that focus on telephony and text messaging.

84. Gartner Says Worldwide Combined PDA and Smartphone Shipments Market Grew 57 Percent in the First Half of 2006, *available at* <http://www.gartner.com/it/page.jsp?id=496997>.

85. *Id.*

86. Gartner Says Worldwide Smartphone Sales Grew 29 Percent in First Quarter of 2008, *available at* <http://www.gartner.com/it/page.jsp?id=688116>.

87. Gartner Says Worldwide Mobile Phone Sales Declined 8.6 Per Cent and Smartphones Grew 12.7 Per Cent in First Quarter of 2009, *available at* <http://www.gartner.com/it/page.jsp?id=985912>.

88. Gartner Says Worldwide Mobile Phone Sales Declined 6 Per Cent and Smartphones Grew 27 Per Cent in Second Quarter of 2009, *available at* <http://www.gartner.com/it/page.jsp?id=1126812>.

89. *Id.*

90. *Id.*

TABLE 3: WORLDWIDE MOBILE TERMINAL SHARE (BASED ON UNITS SOLD), 2005-09

Company	1Q09 Market Share (%)	1Q08 Market Share (%)	1Q07 Market Share (%)	1Q06 Market Share (%)	1Q05 Market Share (%)
Nokia	36.2	39.1	35.7	34.0	30.4
Samsung	19.1	14.4	12.5	12.5	13.5
LG	9.9	8.0	6.2	6.5	6.3
Motorola	6.2	10.2	18.5	20.3	16.7
Sony Ericsson	5.4	7.5	8.4	6.1	5.5
BenQMobile	*	*	*	3.5	5.7
Others**	23.4	20.8	18.8	17.1	21.9
Total	100	100.0	100.0	100.0	100.0

Note: * Less than three percent share. ** Incorporates the shares of carriers with less than three percent share.

Sources: Data from 2008 and 2009 from Gartner Says Worldwide Mobile Phone Sales Declined 8.6 Per Cent and Smartphones Grew 12.7 Per Cent in First Quarter of 2009, available at <http://www.gartner.com/it/page.jsp?id=985912>; data from 2007 from Gartner Says Strong Results in Asia/Pacific and Japan Drove Worldwide Mobile Phone Sales to 14 Percent Growth in the First Quarter of 2007, available at <http://www.gartner.com/it/page.jsp?id=506573>; data from 2006 and 2005 from Gartner Says Worldwide Mobile Phone Sales in First Quarter are Indicative of Another Strong Year in 2006, available at <http://www.gartner.com/it/page.jsp?id=492896>.

Table 3 reveals that some carriers, such as BenQMobile, disappeared from the rankings entirely in 2007 after commanding over five percent of worldwide handset sales in 2005. It also shows that others, such as LG, realized a share increase of five percent in one year from 2008 to 2009. This rapidly changing marketplace landscape is not consistent with the notion of dominance.

To better understand what drove these and other radical shifts in market share, we summarize the major developments in the larger handset market, which includes smartphones (described above) and other types of handsets. Our brief history begins in the early 1990s. Once again, share shifts are frequently driven by the introduction of iconic handsets.

Motorola's (relatively) small MicroTAC, introduced in 1989, allowed it to distance itself from rival device makers.⁹¹ By the middle of the 1990s, however, Nokia (with the introduction of the 9000 Communicator) and Ericsson took about five percentage points from Motorola's share, causing Motorola's share to fall from 65 to 60 percent.⁹² Nokia and Samsung took additional share from Motorola over the subsequent decade, leaving Motorola with less than 20 percent by the middle of the decade. The Nokia 6100 series, introduced in November 1997, featured extended battery life, games, and dual-mode, and digital-wireless technology.⁹³ The Samsung SCH-1000 made Sprint PCS the "first CDMA carrier to offer wireless consumers a choice of phones" in 1997. The phone was the lightest

91. Howard Wolinsky, *Cell Phones Keep Ringing Up Sales*, CHICAGO SUN-TIMES, Jan. 14, 1996, at 39.

92. *Id.*

93. *Nokia Introduces Next Generation Product Family For GSM*, BUSINESS WIRE, Nov. 11, 1997.

CDMA phone at the time.⁹⁴ Motorola's slide was reversed with the introduction of the popular and iconic Razr in 2004.

In 2006, Nokia and Motorola accounted for over half of worldwide mobile phone sales.⁹⁵ Led by its wideband-code-division-multiple-access phones, Nokia was the preferred brand in Western Europe, Central Eastern Europe, the Middle East, Africa, and Asia.⁹⁶ Motorola faced increasing competition in the supply of thin phones.⁹⁷ Samsung fell further behind Motorola.⁹⁸ In 2007, Nokia's continued strong sales were driven by its multimedia-rich phones;⁹⁹ it introduced the 5200 and 5300 in the end of 2006, and it introduced the Nokia 6300 in 2007.¹⁰⁰ Nokia sold close to 1 million Eseries devices to business customers.¹⁰¹ It was on the verge of launching the 2630 and the Navigator.¹⁰² Motorola lost nearly 2 percentage points of market share; it introduced the Razr2 with the hope of stimulating sales.¹⁰³ Samsung's market share remained unchanged relative to 2006, as it focused on "rich features and ultra slim design."¹⁰⁴ Sony Ericsson enjoyed modest share growth driven by both high-end models (K800 and W880) as well as the low and mid-tier products (W300, W200, and the K310).¹⁰⁵ LG also enjoyed share growth via the introduction of the LG Prada as well as new colors of the K800 Chocolate phone.¹⁰⁶

In 2008, Nokia maintained its market leadership due in part to strong sales in the ultra-low-cost segment.¹⁰⁷ Samsung surpassed Motorola in sales by focusing on touch-screen devices.¹⁰⁸ LG overtook Sony Ericsson to become the fourth-largest handset vendor, in part by focusing on touch-screen devices similar to the iPhone,¹⁰⁹ including the LG Prada, Shine, and KF600. Sony Ericsson blamed its weak results on difficult conditions in the Western European market, which led to a weakening in the demand for high-end phones.¹¹⁰

94. *Sprint PCS Announces Availability of Samsung Phone; Samsung Phone Becomes Second Phone Option for Sprint PCS Customers*, BUSINESS WIRE, Aug. 21, 1997.

95. Gartner Says Worldwide Mobile Phone Sales in First Quarter are Indicative of Another Strong Year in 2006, available at <http://www.gartner.com/it/page.jsp?id=492896>

96. *Id.*

97. *Id.*

98. *Id.*

99. Gartner Says Strong Results in Asia/Pacific and Japan Drove Worldwide Mobile Phone Sales to 14 Percent Growth in the First Quarter of 2007, available at <http://www.gartner.com/it/page.jsp?id=506573>.

100. *Id.*

101. *Id.*

102. *Id.*

103. *Id.*

104. *Id.*

105. *Id.*

106. *Id.*

107. Gartner Says Worldwide Mobile Phone Sales Increased 14 Per Cent in First Quarter of 2008, available at <http://www.gartner.com/it/page.jsp?id=680207>.

108. *Id.*

109. *Id.*

110. *Id.*

In 2009, certain handset makers once again experienced significant share shifts. Relative to the first quarter of 2008, Motorola lost four percentage points in its market share by the first quarter of 2009 (from 10.2 to 6.2 percent); Samsung saw its share increase by five percentage points (from 14.4 to 19.1 percent), driven by the introduction of the Omnia, Tocco and Pixon touch-screen handsets.¹¹¹ Motorola appears not to have found a successor to its “once-dominant” Razr.

II. What makes the iPhone special yet not a must-have input for wireless carriers?

Economists are concerned about exclusive contracts between an upstream input provider and a downstream distributor if the excluded input is needed by a distributor’s rivals to effectively compete. Inputs that are deemed essential to preserve downstream competition are called must-have inputs.¹¹² Although there are a few prominent examples,¹¹³ it is hard to conceive of must-have inputs in the telecommunications industry. Must-have inputs are likely to be especially rare in technology markets where rapid innovation causes once “dominant” inputs to be dated in a short period of time. By limiting access to must-have inputs, the distributor may impair competition in one of three ways: (1) discouraging entry, (2) encouraging exit, or (3) raising a rival’s operating costs.¹¹⁴ Consistent with the economic view of exclusive dealing, courts have also focused on whether an input is “essential” or must-have in assessing the merits of cases involving exclusionary conduct.¹¹⁵ In this section, we analyze

111. Gartner Says Worldwide Mobile Phone Sales Declined 8.6 Per Cent and Smartphones Grew 12.7 Per Cent in First Quarter of 2009, *available at* <http://www.gartner.com/it/page.jsp?id=985912>.

112. Patrick Rey & Jean Tirole, *A Primer on Foreclosure* (reprinted in III HANDBOOK OF INDUSTRIAL ORGANIZATION, Mark Armstrong & Rob Porter, eds., 2145-2220, 2007), at *1 (“An input produced by a dominant firm is essential if it cannot be cheaply duplicated by users who are denied access to it.”).

113. For example, the Federal Communications Commission has determined that the television rights to a professional sports team that has been granted an exclusive (regional) territory by a league constitute a must-have input for competitive distributors of video programming. *See, e.g.,* In the Matter of Applications for Consent to the Assignment and/or Transfer of Control of Licenses, MB Dkt. No. 05-192, Memorandum Opinion and Order, released July 21, 2006, FCC 06-105, ¶ 124 (finding that a video distributor’s “ability to gain access to [regional sports networks] and the price and other terms [or] conditions of access can be important factors in its ability to compete with [the distributor’s] rivals.”).

114. Rey & Tirole, *supra*, at 8 (“[W]e will define foreclosure as a situation in which: (i) a firm dominates one market (bottleneck good); and (ii) it uses its market power in the bottleneck good market to restrict output in another market, perhaps but not necessarily by discouraging the entry or encouraging the exit of rivals.”); *see also* Thomas G. Krattenmaker & Steven C. Salop, *Anticompetitive Exclusion: Raising Rivals’ Costs to Achieve Power over Price*, 96 YALE L. J. 234 (1986) (“The simplest and most obvious method by which foreclosure of supply can raise rivals’ costs is that purchaser’s obtaining exclusionary rights from all (or a sufficient number of) the lowest-cost suppliers, where those suppliers determine the input’s market price. Competitors of the purchaser experience a cost increase as they necessarily shift to higher cost suppliers or less efficient inputs. Antitrust literati know this as the ‘Bottleneck’ or ‘essential facilities’ problem.”).

115. *See e.g.,* MCI Communications Corp. v. AT&T, 708 F.2d 1081, 1132-133 (7th Cir. 1983) (In MCI the 7th Circuit stated that plaintiff must prove “(1) control of the essential facility by a monopolist; (2) a competitor’s inability to practically or reasonably duplicate the essential facility; (3) the denial of the use of the facility to a competitor; and (4) the feasibility of providing the facility.”). This general focus on ensuring that rivals maintain the ability to constrain dominant firms’ prices is also at the heart of the Federal Communication Commission’s regulation of affiliated cable programming. *See* 47 U.S.C. § 536(a)(3). Section 616 orders the Federal Communications Commission to promulgate rules that “contain provisions designed to prevent a multichannel video programming distributor from engaging in conduct the effect of which is to unreasonably restrain the ability of an unaffiliated video programming vendor to compete fairly by discriminating in video programming distribution

whether the iPhone would satisfy this must-have criterion that the law and economics recognizes as being necessary to justify intervention.

A. Identifying the key attributes of the iPhone

The iPhone has attracted significant attention since its debut in the summer of 2007, when it drew long lines of fanatical followers who waited for days in front of Apple retail stores and created a scene that was “Part street theater, part ‘iPhone slumber party.’”¹¹⁶ As described above, there are many features of the device that make it an attractive product. Based on analyst reviews, we have identified the following seven features as being the most important attributes:

1. As with the iPod, the iPhone syncs easily with Apple’s popular iTunes software.
2. It supports thousands of applications via its App Store.
3. The iPhone’s touch-screen interface features “multi-touch” capabilities.
4. It supports video streaming of media files.
5. It runs over a super-fast 3G data network.
6. The built-in camera allows users to upload images to sites like Facebook.
7. It includes a GPS chipset that allows users to pinpoint their exact geographic locations.

While there are myriad other features available on the iPhone, these seven appear to be the ones that set the iPhone apart from the pack upon its introduction. The key question for regulators is: Can wireless operators, including rural operators,¹¹⁷ compete effectively in the downstream wireless services market without access to the iPhone and its key features?

B. Are those attributes currently offered by rival smartphones—and if not, will they soon be replicated or superseded?

Based on a review of available handsets in August 2009, we conclude that several competing mobile devices replicate the key features of the iPhone. Table 4 offers a comparison of smartphones that compete with the iPhone, noting which iPhone features are currently replicated or could be replicated in the near future. Almost all of the iPhone’s fundamental attributes are available in rival smartphones. The basic features of email, web browsing, contacts, and calendars are standard.

on the basis of affiliation or nonaffiliation of vendors in the selection, terms, or conditions for carriage of video programming provided by such vendors.”

116. C.W. Nevius, *Wait Worth It, But Unnecessary*, SAN FRANCISCO CHRONICLE, Jun. 30, 2007.

117. See Rural Cellular Association, Petition for Rulemaking Regarding Exclusivity Arrangements between Commercial Wireless Carriers and Handset Manufacturers, May 20, 2008.

TABLE 4: KEY ATTRIBUTES OF THE IPHONE

Feature	Palm Pre	Blackberry Storm	Nokia N97	HTC G1
(1) Syncs with iTunes	Yes ¹	Yes ²	Yes ³	Yes ⁴
(2) Supports tens of thousands of applications	Not Yet ⁵	Over 1000 ⁶	Hundreds ⁷	Thousands ⁸
(3) Touch screen	Yes ⁵	Yes ¹⁰	Yes ¹¹	Yes ¹³
(4) Video streaming	Yes ⁹	Yes ¹²	Yes ¹¹	Yes ¹³
(5) 3G Network	Yes ⁵	Yes ¹⁰	Yes ¹¹	Yes ¹³
(6) Digital camera	Yes ⁵	Yes ¹⁰	Yes ¹¹	Yes ¹³
(7) GPS chipset	Yes ⁵	Yes ¹⁰	Yes ¹¹	Yes ¹³

Source: 1. Philip Elmer-DeWitt, *Scooplet: the Palm Pre syncs with iTunes*, CNN MONEY.COM, May 28, 2009, available at <http://brainstormtech.blogs.fortune.cnn.com/2009/05>. The only exception is that the Pre cannot handle old, copy-protected (DRM protected) songs. 2. Paul Taylor, *BlackBerry's New Squeeze; The Storm Smartphone Introduces a Responsive 'Virtual' Keyboard that is Likely to Appeal to Heavy E-mail Users*, FINANCIAL TIMES, November 21, 2008, at 14. 3. *Nokia Multimedia Transfer*. <https://www.nokiausa.com/get-support-and-software/software/nokia-multimedia-transfer>. 4. Richard Wray, *INQ Reveals Handsets with Twitter and iTunes Sync Built In*, GUARDIAN.CO.UK, August 4, 2009, available at <http://www.guardian.co.uk/technology/2009/aug/04/inq-phone-twitter-itunes-doubletwist>. 5. Pre Features: <http://www.palm.com/us/products/phones/pre/>. 6. BlackBerry App World. 7. Ovi Applications: <https://store.ovi.com/>. 8. G1 Applications: <http://www.android.com/market/>. 9. Pre Streaming: <http://www.pcmag.com/article2/0,2817,2338583,00.asp>. 10. Storm Features: http://na.blackberry.com/eng/devices/blackberrystorm/storm_features.jsp. 11. N97 Features: <http://www.nokiausa.com/find-products/phones/nokia-n97/features>. 12. Storm Streaming: <http://blogs.zdnet.com/Apple/?p=2527>. 13. G1 Features: <http://www.htc.com/us/product/g1/overview.html>

The first row of Table 4 shows that these competing smartphones are also capable of synchronizing with iTunes, albeit sometimes through a third-party program (as is the case with the HTC G1).¹¹⁸ RIM and Nokia have offered their own software which reads the iTunes XML library file and syncs to their devices. In contrast, the Palm Pre identifies itself to a PC as an iPod and syncs with iTunes directly instead of through a 3rd party software. Although Apple temporarily disabled the Palm Pre's ability to sync directly with iTunes through an update to the music software, Palm has pushed back against Apple by updating the Pre's software so that it once again can sync with iTunes.¹¹⁹ Moreover, touch-screen functionality (row 3) and the ability to stream video (row 4) and access data at fast speeds via 3G networks (row 5) are also provided by iPhone's rivals. Digital cameras (row 6) and GPO chipsets (row 7) are standard with these iPhone alternatives.

There are a few differences between the iPhone and its rivals. While competing smartphones include touch screens, the iPhone goes a step further in offering a multi-touch interface that is relatively unique among its peers. The Pre does include multi-touch features like the ability to zoom with the use of two fingers, but the status of these features are uncertain because Apple has been granted patents covering specific multi-touch capabilities used in the iPhone.¹²⁰ Another difference between the iPhone and competing products is the selection of third-party applications available for the device. As of August 2009, the iPhone's App Store has many more additional software choices than do other devices. However, this differential should narrow over time. Google's Android platform, which is used in the HTC

118. The G1 can synchronize with iTunes through a program called DoubleTwist. See Richard Wray, *INQ Reveals Handsets with Twitter and iTunes Sync Built In*, GUARDIAN.CO.UK, Aug. 4, 2009, available at <http://www.guardian.co.uk/technology/2009/aug/04/inq-phone-twitter-itunes-doubletwist>.

119. Jenna Wortham, *Rivalry Between Apple and Palm Intensifies*, NEW YORK TIMES, August 3, 2009, available at <http://www.nytimes.com/2009/08/04/technology/companies/04palm.html>.

120. Rachel Metz, *Apple Disables iTunes sync feature on Palm Pre*, ASSOCIATED PRESS, Jul. 16, 2009, available at <http://www.google.com/hostednews/ap/article/ALeqM5gO4hyk2k4CHsa4p1yhqRAH7gD1gD99FGNA82>

G1, already has thousands of third-party applications, and tens of thousands of developers have downloaded the software development kit for the Palm Pre.¹²¹ Although the iPhone had a head start in the “application wars,” its advantage is not likely to last, as it seems largely due to being introduced first, rather than some intrinsically better functionality.

In summary, there is a lot of competition for the smartphone segment and several smartphones offer similar features to the iPhone. The competition among handset makers is not only leading to innovative designs, but it is also ensuring that the price for smartphones has declined to levels that many Americans can afford. Apple dropped the price of its first generation iPhone to \$99 in 2009 (upon the introduction of the iPhone 3GS), and Palm reduced the price of its Pre shortly after its initial introduction. It seems quite plausible, based on the history of innovation in this area, that a new, iconic phone will emerge that supplants Apple’s iPhone.

C. Even the best device makers, including Apple, stumble at times

Through the introduction of the iconic Blackberry, RIM has proven itself to be a leader in the handset industry. Expectations were high when RIM in November 2008 introduced a touch-screen smartphone, the Blackberry Storm, to compete with the iPhone. But the Storm has proven to be somewhat of a disappointment. Some proponents of regulatory intervention in the handset market have seized on RIM’s initial stumble as evidence of Apple’s dominance.

The Storm received many reviews that were critical. Upon the Storm’s release, Yarden Arar of *PC World* declared, “the Storm’s touch interface feels like a failed experiment.”¹²² David Pogue, an acclaimed technology reviewer for the *New York Times*, offered harsher criticism, calling the Storm the “BlackBerry Dud,” and claiming that he “[hadn’t] found a soul who tried this machine who wasn’t appalled, baffled or both.”¹²³ A review in *Information Week* was severely critical of the Storm’s keypad: “The full QWERTY is spacious, and gives your thumbs plenty of room, but my thumbs felt real fatigue after typing out a 100-word e-mail.”¹²⁴ The reviewer went on to note that the Storm was not responsive to rotations of the phone; the phone would randomly switch from vertical to horizontal orientation even though the phone had not been rotated at all; and the camera software and video playback software both crashed the phone completely several times, requiring the reviewer to pull the battery to reset the

121. Jeffrey Schwartz, *Developers Gather at Palm Pre Dev Camps*, APPLICATION DEVELOPMENT TRENDS MAGAZINE, Aug. 11, 2009, available at <http://adtmag.com/articles/2009/08/11/developers-gather-at-palm-pre-dev-camps.aspx>.

122. Yarden Arar, *RIM’s BlackBerry Storm: Awkward and Disappointing*, PC WORLD, Nov. 20, 2008, available at http://www.pcworld.com/article/154212/rims_blackberry_storm_awkward_and_disappointing.html.

123. David Pogue, *No Keyboard? And You Call this a BlackBerry?*, NEW YORK TIMES, Nov. 26, 2008, available at <http://www.nytimes.com/2008/11/27/technology/personaltech/27pogue.html>.

124. Eric Zeman, *Review: Touch-Screen BlackBerry Storm Gets Mixed Verdict*, InformationWeek, Nov. 24, 2008, available at http://www.informationweek.com/news/personal_tech/smartphones/showArticle.jhtml?articleID=212101426&pgno=1&queryText=&isPrev=.

Storm.¹²⁵ Despite such reviews, the Storm sold over one million units between November 2008 and July 2009.¹²⁶

Some might conclude that RIM's failure to produce a device that could successfully rival the iPhone proves the iPhone's must-have nature. But the fact that the Storm was a disappointment does not mean that the iPhone's market position is permanent. Innovation is a continuous process. Blackberry will likely learn from its successes and failures. There is too much at stake. Indeed, RIM and Verizon are introducing the Storm 2 for the holiday season in 2009, which is expected to have better hardware, a better touch-screen input method, and Wi-Fi access.¹²⁷ And the new Blackberry Tour, which is a smartphone that returns the traditional trackball and the elevated keyboard, has received glowing reviews.¹²⁸

On the subject of disappointing initial debuts, it is worth noting Apple stumbled in its initial attempt to deliver a commercially successful cell phone that integrated with iTunes. In 2005, Apple partnered with Motorola and Cingular (now AT&T) to produce the ROKR, a cell phone designed by Motorola that synchronized with iTunes and could play music like an iPod.¹²⁹ Much like the Blackberry Storm, this phone had significant deficiencies that hindered its commercial prospects. The ROKR could carry only 100 songs, regardless of the amount of memory included on the device, lacked the intuitive controls of an iPod, and took roughly an hour to transfer a complete set of songs from one's computer to the device.¹³⁰ Despite this initial stumble, Apple was able to turn around and release the iPhone within two years, which has proved to be a great success.¹³¹ Thus, we should not assume that competitors will be unable to match or beat the capabilities of the iPhone simply because they stumble once or twice. The competitive environment can change quickly in the world of handsets.

III. The role of exclusive agreements in promoting innovation in the handset market

Table 1 reveals that exclusive distribution agreements are often used in the handset industry. In 2002, T-Mobile was the exclusive distributor of Danger's Sidekick. Motorola's iconic Razr V3 was exclusively offered by AT&T in 2004.¹³² The Blackberry Pearl was introduced in 2006 under an exclusive

125. *Id.*

126. Marin Perez, *Verizon Slashes BlackBerry Storm Price: RIM's touchscreen Storm is now more competitive with the \$100 Apple iPhone 3G from AT&T*, INFORMATIONWEEK, July 20, 2009, available at http://www.informationweek.com/news/mobility/smart_phones/showArticle.jhtml?articleID=218501375.

127. *Id.*

128. See, e.g., Ryan Kellett, *Review: The New Blackberry Tour*, NPR, Aug. 7, 2009, available at http://www.npr.org/blogs/alltechconsidered/2009/08/blackberry_1.html; Steve Ragan, *Review: Verizon's BlackBerry Tour 9630*, THE TECH HERALD, July 20, 2009, available at <http://www.thetechherald.com/article.php/200929/4088/Review-Verizon-s-BlackBerry-Tour-9630>.

129. Walter S. Mossberg, *Music-Playing Cellphones Hit a Flat Note—We Test New iTunes Entry And Two Other Models; Reaching the 100-Song Limit*, WALL STREET JOURNAL, Sep. 14, 2005, available at <http://solution.allthingsd.com/20050914/music-cells-hit-flat-note/>.

130. *Id.*

131. Apple similarly suffered losses when it replaced the Apple II with the Lisa. After almost falling into bankruptcy, it replaced the Lisa with the Mac, and the rest is history.

132. Roger O. Crockett, Daily Briefing, *Cingular: Cool Phones Ring in a Merger; The Wireless Outfit Will Launch its New Life with AT&T Wireless with Exclusive Offers of Snazzy Handsets to Lure High-End Customers*, BUSINESSWEEK ONLINE, Oct. 27, 2004.

contract with T-Mobile.¹³³ AT&T exclusively offered the BlackBerry Curve in 2007.¹³⁴ More recently, AT&T was the exclusive distributor of the iPhone; Verizon was the exclusive distributor of the Storm; and Sprint was (at least through 2009) the exclusive distributor of the Palm Pre and the Kindle. The first Google phone powered by the Android operating system, the G1, is sold exclusively through T-Mobile; so is T-Mobile's second generation Android phone.

The question to which we now turn is: Why do manufacturers and carriers enter into exclusive contracts in the first place? Before considering the benefits, we briefly discuss the costs of aligning with a single carrier from the perspective of a handset maker like Apple. By agreeing to an exclusive agreement with AT&T, Apple greatly reduced the number of consumers its iPhone would reach. At the time of Apple's exclusive deal in 2007,¹³⁵ AT&T had roughly a 30 percent share of the U.S. wireless market. Consequently, an exclusive agreement with AT&T meant that approximately 70 percent of wireless customers would be unable to use the iPhone on their existing network. Palm's exclusive deal with Sprint regarding the Pre is even more curious, given Sprint's roughly 11 percent market share in 2009.

TABLE 5: ESTIMATED MARKET SHARES OF U.S. WIRELESS MARKET, MARCH 2009

	Verizon	AT&T	T-Mobile	Sprint	Metro PCS	U.S. Cellular	Leap	Others
Market share	31%	29%	12%	11%	3%	2%	2%	10%

Sources: Global Wireless Matrix 2Q09, Bank of America | Merrill Lynch Research, Jun. 25, 2009, Table 149; About U.S. Cellular, U.S. Cellular website, last accessed Aug. 20, 2009, available at http://www.uscc.com/usccellular/SilverStream/Pages/x_page.html?p=a_home.

Table 5 shows that the market for U.S. wireless services is not highly concentrated. Indeed, Bank of America-Merrill Lynch estimates that concentration among wireless carriers is less than all but one of the 26 other countries in its survey.¹³⁶ Given this lack of concentration, when a handset maker like Palm aligns itself with a single carrier like Sprint, the handset maker effectively cedes a share of potential sales (in this case, roughly 89 percent of U.S. wireless subscribers).

While it is certainly possible to induce subscribers of rival networks to change networks and incur the associated switching costs, the majority of handset purchases made pursuant to an exclusive agreement are made by the exclusive carrier's customers. For example, two-thirds of iPhone activations in the second quarter of 2009 were for existing AT&T customers.¹³⁷ Sales of the Palm Pre followed the same pattern: the CEO of Sprint claimed that initial sales for the Pre—an exclusive handset offered by Sprint—stemmed largely from Sprint's existing base of customers.¹³⁸ Accordingly, from the handset maker's perspective, the cost of entering into an exclusive contract is likely to be economically

133. *T-Mobile USA and RIM Introduce the Ultra-Sleek BlackBerry Pearl*, MARKET WIRE, Sept. 7, 2006.

134. Joseph Palenchar, *AT&T Throws a BlackBerry Curve*, TWICE, May 30, 2007.

135. FCC's Thirteenth CMRS Report, at A-4.

136. Global Wireless Matrix 2Q09, Bank of America | Merrill Lynch Research, Jun. 25, 2009.

137. One third of iPhone activations in the second quarter of 2009 were for customers new to AT&T. See *Mobile and Wireless iPhone 3GS Launch was AT&T's Best Day Ever*, EWEEK, July 23, 2009.

138. Roger Cheng, *Sprint's Woes Continue Despite Palm Pre Debut*, THE WALL STREET JOURNAL, July 30, 2009, at B9 (quoting Dan Hesse as saying "Pre buyers have largely been existing Sprint subscribers.").

significant. Because handset makers would not enter into exclusives unless they were profitable, it must be the case that Palm's expected gains from the transaction exceeded these significant costs.

A. Procompetitive motivations for exclusive handset contracts

So what motivates these exclusive contracts? Handset makers seek exclusive agreements with carriers, not as part of some anticompetitive scheme to foreclose the carrier's downstream rivals, but to share the enormous risk associated with launching a new device, to align the incentives of the carrier with the handset maker, and to ensure network quality. Economic research has demonstrated that voluntary, exclusive contracts are often motivated for procompetitive reasons.¹³⁹ From the perspective of a handset maker like Apple, aligning with a single carrier like AT&T ensures that Apple does not incur all of the downside in the event that the phone flops. The agreement also ensures that AT&T will make iPhone-specific investments such as marketing support, handset subsidies, and modifying its network to accommodate the bandwidth-intensive applications. The network upgrades that AT&T had to make to support the iPhone suggests that the iPhone would not be immediately available to operate on other carriers' networks that had not been similarly upgraded.

1. Risk sharing

Exclusive contracts may correct dealer-incentive issues that occur when the manufacturer wants the dealer to invest up front in specific facilities or human capital to provide better service to consumers.¹⁴⁰ Applied here, handset manufacturers often require operators, as part of an exclusive agreement, to commit to investing in technical support for new handsets. But perhaps the largest commitment carriers make to the handset maker is to subsidize the cost of the handset so that it is more affordable to consumers. The (first-generation) iPhone models debuted unsubsidized by AT&T at \$499 and \$599.¹⁴¹ AT&T subsidized the second-generation iPhone.¹⁴² In particular, AT&T paid Apple \$300 per 8 gigabyte iPhone 3G,¹⁴³ leaving AT&T's customers the balance of \$199 (equal to the \$499 total price less the \$300 subsidy).¹⁴⁴ Verizon pays RIM roughly \$200¹⁴⁵ toward the \$399 total price of the Storm, leaving its customers the balance of \$199. Sprint pays Palm at least \$340 for each Pre,¹⁴⁶ leaving its customers a more reasonable charge of \$199 after rebate. Even lower-end phones can draw \$100

139. For a review of the economic literature on the welfare effects of vertical restraints, see Francine Lafontaine, *Exclusive Contracts and Vertical Restraints: Empirical Evidence and Public Policy Advances in the Economics of Competition Law*, June 2005.

140. Lafontaine, *supra*, at 7.

141. Apple press release, *Apple Sets iPhone Price at \$399 for this Holiday Season*, Sept. 5, 2009, available at <http://www.apple.com/pr/library/2007/09/05iphone.html>.

142. Arik Hesseldahl, *Why AT&T May Deep-Discount The iPhone; with Competitive Pressures Mounting, The Phone Company May Cut The iPhone's Price to Boost Demand—and Cement Its Relationship with Apple*, BUSINESSWEEK ONLINE, May 2, 2008.

143. Leslie Cauley, *"We're all about wireless"; AT&T's Stephenson's iPhone Deal with Apple Is Part of Global Strategy*, USA TODAY, Aug. 1, 2008.

144. Jamie Lendino, *Study: BlackBerry Storm Costs More to Build than iPhone*, PCMAG.COM, Jan. 30, 2009, available at <http://www.pcmag.com/article2/0,2817,2339876,00.asp>.

145. Sara Silver, *Apple, RIM Outsmart Phone Market*, THE WALL STREET JOURNAL, Jul. 20, 2009.

146. *Sprint reports big rise in cell subsidies*, REUTERS, Aug. 4, 2009, available at <http://www.reuters.com/article/hotStocksNews/idUSTRE57373020090804>.

subsidies from carriers.¹⁴⁷ Such subsidies are properly considered brand-specific commitments that are secured via the exclusive. Marketing support or promotion, which may also be considered a form of upfront investment, is discussed below.

Risk sharing is even more important in the supply of mobile handsets given the combination of the massive upfront costs of developing a new phone and the uncertainty of demand for the new product. The shortcomings of the ROKR and the Storm highlight the demand uncertainty faced by handset makers; even the backing of a big carrier cannot guarantee success. With respect to the significance of the upfront costs, Apple reportedly incurred \$150 million in developing the iPhone;¹⁴⁸ Palm incurred \$393.8 million in research and development in fiscal years 2008 and 2009, leading up to the launch of the Pre.¹⁴⁹ Motorola invested an “unheard of” \$20 million in research and development for its MicroTAC device that debuted in 1989.¹⁵⁰ Handset makers appear to value having a partner that has access to a base of installed subscribers to share some of their R&D risk. Although the exclusive agreement impairs the handset maker’s access to large slices of the market (by virtue of each carrier’s limited market shares), the agreement does give the handset maker assurance that at least some installed base of customers will likely purchase the new device.

2. Marketing support

Exclusive contracts also facilitate the coordination of marketing efforts between the downstream distributors and the upstream manufacturers of a product. In the absence of an exclusive agreement, downstream distributors will be hesitant to expend resources marketing a product because some of the benefits of marketing will accrue to downstream rivals. To make matters concrete, consider Verizon’s decision to market the Blackberry Storm if customers who see the advertisement choose to buy the Storm from a rival carrier.

Because downstream distributors do not appropriate the entire benefit of their marketing expenditures, they will invest less in marketing. This problem is known as the “free-rider” problem in economics; rather than reap the benefits of their own marketing investments, firms will attempt to appropriate the benefits of their rivals’ marketing campaigns. Exclusive contracts between producers and distributors allow distributors to appropriate the entire benefit of their marketing expenditures. In some circumstances, exclusive contracts can induce downstream firms to invest in the optimal level of marketing.¹⁵¹ This coordination of marketing efforts between the handset maker and the carrier also benefits consumers. As two prominent competition economists recently wrote, when firms are able to free-ride off the marketing expenditures of other firms, “competition between retailers is likely to generate an insufficient level of service from both the firms’ and the consumers’ point of view. Vertical

147. Silver, *supra*.

148. Testimony of Barbara S. Esbin, Senior Fellow and Director of the Progress and Freedom Foundation, before the Senate Commerce, Science and Transportation Committee on the Consumer Wireless Experience, June 17, 2009.

149. Palm, Inc., Form 10-K (Annual Report), Jul. 24, 2009, at 8.

150. Howard Wolinsky, *Cell Phones Keep Ringing Up Sales*, CHICAGO SUN-TIMES, Jan. 14, 1996, at 39.

151. Frank Mathewson and Ralph Winter, *An Economic Theory of Vertical Restraints*, 15 RAND JOURNAL OF ECONOMICS 27-38 (1984).

restraints are thus likely to be socially desirable.”¹⁵² Exclusive agreements are one type of vertical restraint that can correct the free-rider problem.

Given the large investments AT&T has made in marketing the iPhone, there is no question that the exclusive contract between Apple and AT&T has benefitted both Apple and consumers. AT&T’s 2008 Annual Shareholder Report suggests that its large outlays for advertising have been a significant factor in driving iPhone sales.¹⁵³ AT&T attributed increased sales and advertising expenses of \$572 million to “Apple iPhone related costs” for its 2007 fiscal year.¹⁵⁴ Expenditures of this magnitude would not have been likely in the absence of an exclusive agreement covering the iPhone.

3. Quality assurance and reputation

Exclusive deals also benefit upstream manufacturers and consumers by assuring product quality.¹⁵⁵ Specifically, exclusive dealing allows a manufacturer to closely monitor the distribution of its product so that the product does not become associated with distributors who might harm the manufacturer’s brand.¹⁵⁶ This theory is particularly applicable to wireless handsets because the final handset product is necessarily tied to the network on which the handset is used. Thus, through an exclusive contract, a manufacturer like Apple can ensure that its handset is only used on a wireless network that can meet its exacting demands. AT&T invested an additional \$2.5 billion in spectrum to accommodate the release of the iPhone 3GS.¹⁵⁷

B. Why the critics of handset exclusivity are wrong

Critics of exclusive contracts begin their analysis with a faulty premise—namely, that wireless carriers impose exclusivity provisions on handset manufacturers. Under the traditional paradigm of monopoly-leveraging, a carrier with excessive downstream market power would demand exclusivity (or even equity in the handset) as a condition of granting access to the carriers’ customers. Having secured exclusivity, the carrier would then deny the must-have input to its rivals to distort downstream competition. A July 2009 letter to the *Wall Street Journal* by Hu Meena, President of Cellular South, argues that the nationwide carriers were seeking to impose exclusive contracts to increase their market power: “Now, as ‘kings of the jungle’ demand and get exclusive device deals to further increase their market share.”¹⁵⁸ But that story does not appear to apply here. A review of the circumstances surrounding the development of the iPhone reveals that the exclusivity agreement was the result of

152. Patrick Rey & Thibaud Vergé, *The Economics of Vertical Restraints*, ADVANCES OF THE ECONOMICS OF COMPETITION LAW 18 (2005).

153. AT&T Inc. Annual Report 2008, at 26 (“Contributing to our net additions and retail customer growth was improvement in postpaid customer turnover (customer churn) levels due to our strong network performance and attractive products and service offerings, including the Apple iPhone. The improvement in Churn levels benefited from network and customer service improvements and continued high levels of advertising.”)

154. *Id.* at 28.

155. Jonathan M. Jacobson, *Exclusive Dealing, “Foreclosure,” and Consumer Harm*, 70 ANTITRUST LAW JOURNAL 358 (2002).

156. Rey & Tirole, *supra*, at 78.

157. MarketingVox, *AT&T Buys Spectrum to Support 3G iPhone*, available at <http://www.marketingvox.com/att-buys-up-spectrum-preparing-for-3g-iphone-etc-033660/>.

158. Hu Meena, *Justice Is Right to Preserve Wireless Customer Choices*, WALL STREET JOURNAL, July 13, 2009, at A12.

Apple's extremely aggressive negotiating strategy. As we demonstrate below, it is often the handset manufacturers, and not the carriers, who are seeking the exclusive agreements.

For example, Apple viewed an exclusive contract with AT&T as a means to secure what has been described as an "unprecedented"¹⁵⁹ position in the development of a wireless handset. As part of this exclusive deal, Apple demanded that AT&T not place AT&T's brand on the phone, that AT&T distribute to Apple a portion of its monthly subscriber revenues, that the iPhone would only be available at Apple or AT&T stores, and that Apple maintain sole discretion as to whether to repair or replace defective iPhones.¹⁶⁰ Apple also insisted that the iPhone's development be completely secret. Apple only allowed three AT&T executives to see the phone prior to its release.¹⁶¹ Verizon rejected this offer by Apple to make Verizon the exclusive distributor of the iPhone.¹⁶² This anecdote makes clear that AT&T's exclusive agreement with Apple was not a unilateral exercise of market power on the part of AT&T, but rather the result of hard bargaining on the part of Apple.

While the story of Palm's exclusive with Sprint is less clear in terms of which party was seeking to impose the exclusivity, it certainly is not consistent with the suggestion that exclusives are motivated for anticompetitive reasons. With the Palm Pre, Sprint was hoping to start a long recovery, having lost two percent of its customers in the fourth quarter of 2008 and nearly another one percent through the second quarter of 2009.¹⁶³ Sprint CEO Dan Hesse called the Pre Sprint's "coming-out party,"¹⁶⁴ demonstrating to customers Sprint's reorganized customer service¹⁶⁵ and improved network.¹⁶⁶ Palm may have more to lose than Sprint.¹⁶⁷ Palm has been suffering for several years as its Palm OS and Windows Mobile-based phones have failed to take hold.¹⁶⁸ Palm reportedly teamed up with Sprint because it was a "comfortable"¹⁶⁹ fit—Palm has sold an increasing proportion of its devices through Sprint over the last three years.¹⁷⁰ Palm's former CEO Ed Colligan said that the choice of carrier "came

159. Fred Vogelstein, *The Untold Story: How the iPhone Blew Up the Wireless Industry*, WIRED MAGAZINE, Jan. 9, 2008.

160. Leslie Cauley, *Verizon Rejected Apple iPhone Deal*, USA TODAY, Jan. 29, 2007; Amol Sharma, Nick Wingfield & Li Yuan, *Apple Coup: How Steve Jobs Played Hardball In iPhone Birth*, WALL STREET JOURNAL, Feb. 17, 2007.

161. *Id.*

162. *Id.*

163. Robert Cyran and Jeff Segal, *Survival Mode*, THE NEW YORK TIMES, Feb. 20, 2009 (Sprint lost 1.3 million customers in 4Q2008). *Palm Pre Cannot Rescue Sprint from Second Quarter Loss*, EWEEK, Jul. 29, 2009 ("[C]ustomer numbers fell from 29.1 million at the end of the first quarter of 2009 to 48.8 million at the end of the second").

164. Sinead Carew, *UPDATE 2-Sprint CEO Sees Pre As Sprint "Coming Out Party"*, REUTERS NEWS, Jun. 5, 2009.

165. Cecilia Kang, *Sprint Wiring Itself for a Comeback; Nation's No. 3 Bets on Palm Pre, Big Cuts*, WASHINGTON POST, Jun. 27, 2009, at A10.

166. Jeffry Bartash, *Sprint Aims to Turn the Corner with Palm Pre; Nation's Third-Largest Wireless Phone Company Still Faces High Hurdles*, MARKETWATCH, May 22, 2009.

167. *Id.* ("The Pre has effectively tied the fates of the two companies together, though the stakes are much higher for Palm.... Although the Pre is not critical to Sprint's survival, the carrier badly needs a big hit and a burst of good publicity, if only to change how it is viewed in the marketplace.").

168. Dan Gallagher, *Palm Shares Rise Despite Sharp Miss; Wall Street Looks Past Warning to Release of Pre Phone Later This Year*, MARKETWATCH, Mar. 4, 2009.

169. *Make-or-Break*, *supra* at note 5.

170. Palm Inc., Form 10-K, filed Jul. 24, 2009, at 7.

down to a long term relationship that we continue to build.”¹⁷¹ It is worth noting that duration of this exclusive agreement appears to be short-lived: Verizon announced at the end of May 2009 (before Sprint had even started selling the phone) that it too would offer the Pre by the beginning of 2010.¹⁷²

IV. Other disruptive technologies on the horizon

Thus far, we have focused on competition for the supply of handsets. Because most consumers typically purchase a *bundle* of products—a handset, an operating system, and wireless service (as opposed to a standalone handset)—wireless carriers compete for consumers through the quality and coverage of their networks in addition to the handsets they offer. Accordingly, our discussion would be incomplete without an analysis of the other important areas of competition: improved networks and operating systems. As it turns out, many of the innovations that affect the mobile user’s experience—and threaten to disrupt the hegemony of today’s handset makers—are occurring in these areas.

A. Improved networks

As of mid-2009, wireless carriers were battling to be the first to implement a 4G wireless network. There were two major 4G technologies in development: LTE and WiMAX. Many analysts forecasted that LTE would have a momentous impact on the wireless industry.¹⁷³ Verizon, AT&T, T-Mobile, and MetroPCS are all developing LTE networks.¹⁷⁴ Indeed, some analysts speculated that MetroPCS, which is a relatively small carrier, would be the first to successfully implement an LTE network.¹⁷⁵ Verizon has announced that it will deploy LTE in 2010, while AT&T has indicated that that it will deploy LTE in 2011. In 2009, Sprint entered into a joint-venture with Clearwire and Intel to deploy a 4G WiMAX network.¹⁷⁶ Sprint has rolled out a WiMAX network in Baltimore and announced planned launches in other cities.¹⁷⁷

Many industry observers and participants have speculated that 4G technology will have a revolutionary effect on the wireless industry. For instance, Nortel suggested that 4G mobile broadband had the potential to be a “truly disruptive technology.”¹⁷⁸ A recent book on wireless networks, *The New World of Wireless: How to Compete in the 4G Revolution*, suggests that 4G technology will “have the

171. *Palm's New Smartphone*, video, Fox Business, Jan. 9, 2009, available at http://video.foxbusiness.com/3426868/?category_id=674e01bfa4d9429ada295c5192bcf2bf805d63dc.

172. *Palm Inc. Gains on iPhone Compatibility; Verizon Plans to Sell 'Pre' Phone*, MIDNIGHTTRADER, May 28, 2009.

173. *Cell Life, A Primer on LTE*, Apr. 6, 2009 available at <http://www.cellstrat.com/blog/?p=870> (“The impact of LTE is so big that even powerful carriers which were on the alternate CDMA path like Verizon Wireless of the United States, have decided to go with LTE in their next generation 4G evolution.”).

174. *Id.*

175. *Id.*

176. Richard Grigonis, *Sprint (WiMAX) vs. Verizon (LTE)*, NGN MAGAZINE, May/Jun. 2009, available at <http://www.tmcnet.com/ngnmag/0509/sprint-vs-verizon.htm>.

177. *Id.*

178. Nortel, *4G Mobile Broadband*, available at http://www2.nortel.com/go/solution_content.jsp?segId=0&catId=0&parId=0&prod_id=61702

potential to create major disruptions not only in the wireless sector, but in communications as a whole.”¹⁷⁹

B. Improved operating systems

In addition to competition driven by advances in wireless carriers’ networks, advances in handset operating systems promise to rearrange the entire wireless landscape. While 4G networks are months or years away, the next generation of mobile operating systems is imminent. As of 2009, certain operating systems had become well-established. According to Gartner Research, roughly half of the smartphones sold worldwide in 2008 ran Nokia’s Symbian operating system,¹⁸⁰ over 16 percent ran RIM’s BlackBerry operating systems, and nearly 12 percent ran Microsoft’s Windows Mobile.¹⁸¹ These operating systems face increasing competition. As the *Economist* explained, a battle is raging over “Smart-Phones’ Souls”—the next frontier of competition in the wireless market will focus on “software, services, and content” rather than “hardware.”¹⁸² Some of the newest entrants into the smartphone operating system market are based on the open-source software Linux, which runs everything from servers to cell phones.¹⁸³ Open sourcing offers a low-cost alternative to proprietary software, and makes it easier for third parties to develop apps for a platform that runs on many different devices.¹⁸⁴ Worldwide sales of Linux-based phones in 2008 were up 19 percent from the previous year, while the share of the once-popular Symbian operating systems slid significantly.¹⁸⁵

In the summer of 2008, Google launched its Linux-based, open-source Android operating system with the Open Handset Alliance of 47 telecom and technology companies.¹⁸⁶ An increasing number of handsets run on Android. Gartner Research has estimated that Android phones comprised 20 percent of the Linux phones sold in the fourth quarter of 2008 worldwide.¹⁸⁷ In September 2008, T-Mobile was the first to offer an Android phone, called G1, built by HTC.¹⁸⁸ In August 2009, T-Mobile released in Europe and Asia its second-generation Android phone, called myTouch 3G, a version of HTC’s well-received “Hero.” Although the myTouch 3G lacks the iPhone’s multi-touch screen, it has access to the significant and growing library of apps developed for Android. The G1’s earlier version of Android was not “ready

179. Scott A. Snyder, *The Swarm Analogy and the Wireless Revolution*, FINANCIAL TIMES PRESS, Jul. 30, 2009, available at <http://www.ftpress.com/articles/article.aspx?p=1377269&seqNum=6>.

180. *The Battle for the Smart-Phone’s Soul*, THE ECONOMIST, Nov. 20, 2008. Symbian no longer belongs to Nokia. Nokia bought out the other stakeholders in the OS and made it open source. This had the advantage of ending Nokia’s licensing costs.

181. Gartner Research Press Release, *Gartner Says Worldwide Smartphone Sales Reached Its Lowest Growth Rate With 3.7 Per Cent Increase in Fourth Quarter of 2008*, May 20, 2009, available at <http://www.gartner.com/it/page.jsp?id=910112>.

182. *The Battle for the Smart-Phone’s Soul*, *supra*.

183. *Linus Torvalds Bio*, LINUX ONLINE INC., available at <http://www.linux.org/info/linus.html>.

184. *The Battle for the Smart-Phone’s Soul*, *supra*. (Software adds 20% to the cost of phones.)

185. Gartner, *supra*.

186. FAQ, OPEN HANDSET ALLIANCE, Nov. 2007, available at http://www.openhandsetalliance.com/oha_faq.html.

187. Gartner, *supra*. Note that 8.4 percent of the smartphones sold in that quarter were Linux-based, up 19 percent from the previous year.)

188. *Android Timeline*, ANDROID.COM, Oct. 21, 2008, available at <http://www.android.com/about/timeline.html>.

for prime time,” Sprint CEO Dan Hesse has said.¹⁸⁹ *BusinessWeek* claims that “Android has a better than decent shot” at building a substantial competitive presence.¹⁹⁰ Other companies, including Samsung, LG, and Motorola, are set to bring out Android-based phones in the near future.¹⁹¹ Google notes that as many as 18 different Android phones will be available by the end of 2009.¹⁹²

In mid-2009, Verizon was reportedly close to offering an Android-based Motorola phone (codenamed “Sholes”), which would support multi-touch input, an eight-megapixel camera, and powerful graphics hardware to appeal to mobile gamers. Another Motorola Android phone, named “Morisson,” was reportedly being sold through T-Mobile. Confirmation of these reports is expected at the Motorola Motodev Summit in October 2009.¹⁹³ In August 2009, Motorola confirmed for its investors that it will be shipping Android-based phones.¹⁹⁴

Finally, Linux Mobile (“LiMo”) is being developed by an association of 50 technology and telecommunications companies,¹⁹⁵ including Samsung and Vodafone.¹⁹⁶ LiMo, however, differs from WebOS (which runs the Pre) and Android in that the consortium is focusing on building a flexible operating system rather than a user interface.¹⁹⁷ Phones built with LiMo will not have the distinctive user experiences that iPhone, Android, or WebOS phones carry; yet the software has attracted new members to the consortium for its potential to cut development costs while leaving phone makers flexible to create their own user interfaces.¹⁹⁸ Currently LiMo boasts over 30 handsets, including several models by Motorola, NEC, and Panasonic.¹⁹⁹

V. Learning from Past Mistakes

In dynamic industries, regulators need be more tolerant of new technologies that appear to be dominant. Unfortunately, the Federal Communications Commission appears not to have always heeded this advice. The agency has at times prematurely declared certain technologies as being dominant, and imposed harmful regulation. In the late 1970s, it required that wireline telephone companies

189. Ian Fried, *Sprint CEO: We're glad we waited on Android*, CNET NEWS, Jul. 24, 2009.

190. Stephen H. Wildstrom, *Google's Android: Now a Contender*, BUSINESS WEEK, Jul. 22, 2009.

191. *Id.*

192. Matt Richtel, blog entry, Google: Expect 18 Android Phones by Year's End, May 27, 2009, available at <http://bits.blogs.nytimes.com/2009/05/27/google-expect-18-android-phones-by-years-end>.

193. See e.g., Taylor Wimberly, blog entry, *Official Multitouch to Appear on Android 2.0?*, CNET BLOG NETWORK, ANDROID ATLAS, Aug. 11, 2009; Taylor Wimberly, blog entry, *Motorola Sholes for Verizon: New Predications and CPU Specs*, ANDROID AND ME, Aug. 7, 2009. Taylor Wimberly, blog entry, *Motorola Morrison specs—Next T-Mobile Android phone*, ANDROID AND ME, Aug. 9, 2009.

194. *Android a Key to Motorola Turnaround Says Report*, EWEEK, Aug. 3, 2009.

195. *The Battle for the Smart-Phone's Soul*, *supra*.

196. *Governance*, LiMO FOUNDATION, available at <http://www.limofoundation.org/en/governance.html>.

197. *Frequently Asked Questions*, LiMO FOUNDATION, available at <http://www.limofoundation.org/en/faqs.html>.

198. Tricia Duye, *Verizon, Mozilla, SK Telecom And Others Join Mobile Linux Efforts; Enterprise Targeted*, THE WASHINGTON POST from MocoNews.net, May 14, 2008, available at http://www.washingtonpost.com/wp-dyn/content/article/2008/05/14/AR2008051401563_pf.html.

199. *LiMo Handsets*, LiMO FOUNDATION, available at <http://www.limofoundation.org/solutions/index.php>.

“unbundle” telephone equipment from telephone services;²⁰⁰ in 1981, it extended this requirement to the cellular operations of the telephone companies.²⁰¹ Accordingly, cellular providers that were affiliated with wireline telephone companies could not sell mobile handsets, nor could they offer certain additional services such as voicemail.²⁰² As we explained above, these regulations likely reduced welfare because handset makers could not properly incentivize wireless operators to invest in an efficient level of promotion and device-specific infrastructure.

Skeptics might ask: What is the harm from declaring a technology in a dynamic industry to be dominant? Can’t the regulation, as in the case of cellular unbundling rules, be reversed? Unfortunately, reversing an inefficient policy may not eliminate the harm, especially when the harm results from delaying the introduction of a new technology. After imposing regulations on cellular carriers in the early 1980s that barred the bundling of handsets with service, the FCC eventually recognized that competition between the cellular licensees rendered such regulation unnecessary, and in 1992, it allowed the bundling of cellular service and mobile phones.²⁰³ In the intervening eleven years, however, all the potential economies of scope associated with selling handsets and wireless services (and the associated consumer benefits) were squandered. And the incentive problems identified above concerning handset makers and distributors could not be corrected due to regulatory obstacles.

Empirical evidence suggests that the FCC’s intervention in the mobile handset market may have postponed the development of the U.S. wireless industry between 1981 and 1992. Although we lack data for U.S. handset sales prior to 1990, global CDMA sales serve as a reasonable proxy for U.S. handset sales around that time: CDMA was adopted by the Telecommunications Industry Association as the North American digital cellular standard in 1993, and it was standardized for Personal Communications Services in the United States in 1993.²⁰⁴ Figure 1 shows the growth in global handset sales by technology from 1983 to 2009.

200. *Amendment of Section 64.702 of the Commission’s Rules and Regulations (Second Computer Inquiry)*, Final Decision, 77 FCC 2d 384.

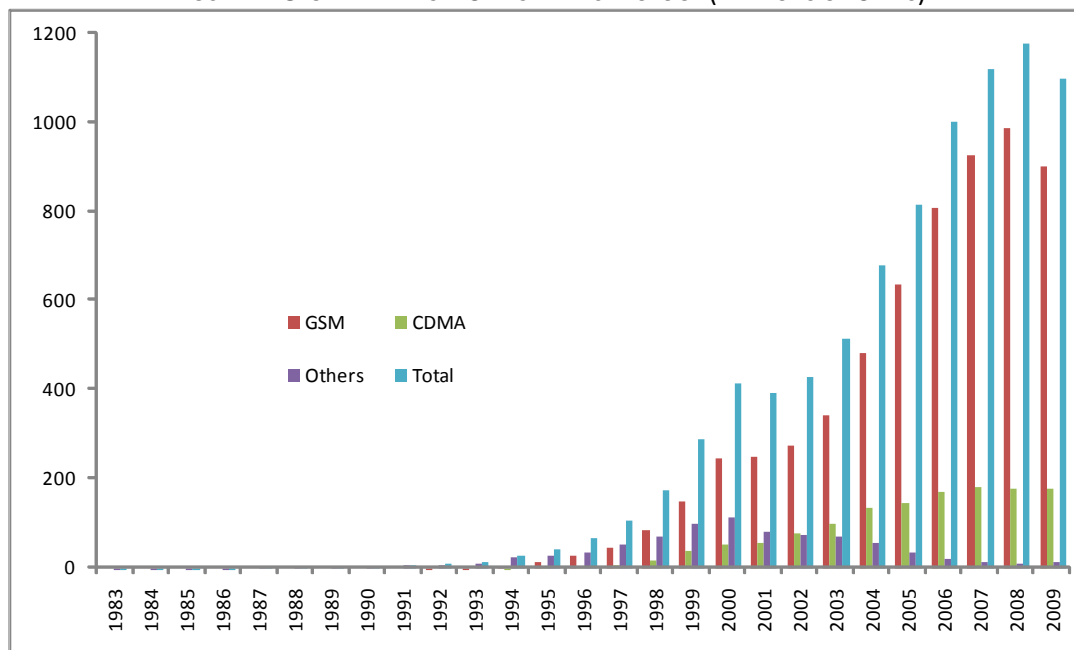
201. *Cellular Communications Systems*, 86 FCC 2d 469 (1981).

202. The Commission similarly declared DSL providers to be dominant in the late 1990s, and forced them to resell their services at regulated prices—despite the fact that cable modem subscriptions vastly exceed DSL subscriptions.

203. *Bundling of Cellular Customer Premises Equipment and Cellular Service*, Report and Order, CC Docket No. 91-34 (1992).

204. CDMA Certification Forum, History of CDMA, available at http://www.globalccf.org/history_of_cdma.php.

FIGURE 1: GLOBAL HANDSET SALES BY TECHNOLOGY (MILLIONS OF UNITS)



Source: Strategy Analytics

According to Strategy Analytics, CDMA sales were non-existent in the 1980s, sputtered in the early and mid-1990s, and did not reach 10 million units until 1998. In contrast, the sales of non-CDMA phones reached 10 million units by 1993. Given this five-year lag, it is reasonable to ask whether the FCC's prohibition of bundled handsets and wireless services along with other harmful interference described below significantly slowed the adoption of CDMA handsets in the United States.

We are not the first to link the FCC's regulatory intervention in the mobile handset market to reductions in consumer welfare. In a seminal article published in 1997, Professor Jerry Hausman of MIT estimated that the Commission's delay in introducing cellular service cost Americans roughly \$25 billion per year in lost welfare.²⁰⁵ He attributes the delay to, among other things, the Commission's decision to delay the operations of the incumbent wireline network until the non-wireline network could begin operations. This type of interference, like the ban on bundling handsets and wireless service, squarely fits the paradigm of prematurely declaring dominance. Dr. Hausman concludes that "regulatory indecision made a new good, cellular telephone, unavailable in the United States when it was being offered in Scandinavia and Japan using equipment invented by AT&T Bell Labs."²⁰⁶ To the extent that the FCC's intervention in the mobile handset market in the 1980s slowed the pace of innovation, the associated consumer benefits of those new services were also delayed.

205. See, e.g., Jerry Hausman, *Valuation and the Effect of Regulation on New Services in Telecommunications*, BROOKINGS PAPERS ON ECONOMIC ACTIVITY: MICROECONOMICS 1-38 (1997).

206. *Id.* at 20.

VI. Conclusion

Our overarching conclusion is that regulators should be very reluctant to intervene in the mobile handset market given the pace of innovation, the lack of any apparent anticompetitive motivation for exclusive contracts, and the significant efficiencies associated with exclusive agreements. Given the pace of technology development in the mobile handset market, the iPhone's position is hardly guaranteed. A new device could render the iPhone obsolete quickly. Ironically, the best way to replace the iPhone could be through an exclusive contract between a handset maker and some other carrier.

Regulators may not fully incorporate the economic cost of intervention in their decision making because it is hard to assess the innovation that would have occurred in the absence of such intervention. In contrast, the benefits of intervention are easier to assess, and there is often a constituency that stands to reap those benefits. For example, some small rural carriers argue that terminating the iPhone-AT&T exclusive would enable them to offer the iPhone and more aggressively compete with AT&T for customers.

But do rural carriers or non-AT&T national carriers need access to the iPhone to compete effectively with AT&T? Our analysis in Part II shows that, while the iPhone is certainly special, there is nothing about it that constitutes a must-have input from the perspective of economics. The question should not be whether a company such as Cellular South would benefit with access to the iPhone (it likely would), but rather whether Cellular South needs the iPhone to constrain the price of AT&T's wireless offerings, so that consumers would benefit. We are not aware of any evidence that AT&T has been able to raise its wireless prices as a result of its exclusive contract with Apple.

Regulations that prohibited exclusive contracts for handsets also would impose significant costs, as described above in Part III. Specifically, the efficiencies made possible by an exclusive agreement—superior innovation in design, coordination and development between device manufacturers and network providers to optimize the consumer experience with the device and the supporting services and shared risk in deploying massive marketing and consumer awareness campaigns—would no longer be available to handset makers, wireless carriers, and their customers. Indeed, the next iconic device that requires an exclusive contract to get off the ground would simply not be developed. These are real costs, but because they are harder to assess, policymakers who may be subject to political pressures may pay insufficient attention to them.

In summary, we are not good at predicting the future of technology, especially when markets are subject to rapid change. Precisely because the mobile handset market is so dynamic, regulators should err on the side of doing less. If a dominant handset emerges that is effectively sealed off by virtue of an exclusive contract, we believe that antitrust authorities could swiftly curb any abuse. In the meantime, the availability of exclusive agreements between wireless carriers and handset manufacturers should make it more likely that the next big thing in mobile handsets emerges sooner rather than later.